

a microstrip transmission line structure having a ground plane separated from a strip conductor by a dielectric layer, said ground plane defining an aperture;
quarter wavelength matching sections in the microstrip transmission line
a waveguide channel having a conductive periphery being electrically coupled to the ground plane to provide a waveguide short circuit wall located at the end of the waveguide channel;
at least one conducting ridge inside the waveguide channel; and
an end of the ridge being electrically coupled with the ground plane.

2. (Previously Presented as Claim 26) A waveguide to microstrip T-junction comprising:

a microstrip transmission line structure having a ground plane separated from a strip conductor by a dielectric layer, said ground plane defining an aperture;
an open circuited stub, and a quarter wavelength matching section in the microstrip transmission line;
a waveguide channel having a conductive periphery being electrically coupled to the ground plane to provide a waveguide short circuit wall located at the end of the waveguide channel;
at least one conducting ridge inside the waveguide channel; and
an end of the ridge being electrically coupled with the ground plane.

3. (Previously Presented as Claim 27) A waveguide to microstrip T-junction comprising:

a microstrip transmission line structure having a ground plane separated from a strip conductor by a dielectric layer, said ground plane defining an aperture;
a short circuited stub using a via, and a quarter wavelength matching section in the microstrip transmission line;
a waveguide channel having a conductive periphery being electrically coupled to the ground plane to provide a waveguide short circuit wall located at the end of the waveguide channel;
at least one conducting ridge inside the waveguide channel; and
an end of the ridge being electrically coupled with the ground plane.

4. (Previously Presented as Claim 28) A waveguide to microstrip T-junction comprising:

- a microstrip transmission line structure having a ground plane separated from a strip conductor by a dielectric layer;

- a waveguide channel having a conductive periphery being electrically coupled to the ground plane to provide a waveguide short circuit wall located at the end of the waveguide channel;

- a single finite length, rectangular cross-sectional conducting ridge inside the waveguide channel, such that the ridge is electrically coupled to the waveguide periphery, the end of the ridge is electrically coupled with the ground plane at the end of the waveguide channel, and the ridge provides a gap between itself and the waveguide periphery; and

- a C-shaped aperture in the ground plane section circumscribed by the waveguide periphery and ridge coupling with the ground plane.

5. (Previously Presented as Dependent Claim 3) A waveguide to microstrip T-junction comprising:

- a microstrip transmission line structure having a ground plane separated from a strip conductor by a dielectric layer, said ground plane defining an aperture;

- a waveguide channel having a conductive periphery being electrically coupled to the ground plane to provide a waveguide short circuit wall located at the end of the waveguide channel;

- at least one conducting ridge inside the waveguide channel;

- an end of the ridge being electrically coupled with the ground plane; and

- a second ridge, wherein a projection of a gap between the ridges on the ground plane, is transverse to the microstrip line.

6. (Previously Presented as Dependent Claim 18) A waveguide to microstrip T-junction comprising:

- a microstrip transmission line structure having a ground plane separated from a strip conductor by a dielectric layer;

- a waveguide channel having a conductive periphery being electrically coupled to the ground plane to provide a waveguide short circuit wall located at the end of the waveguide channel;

a single finite length, rectangular cross-sectional conducting ridge inside the waveguide channel, such that the ridge is electrically coupled to the waveguide periphery, the end of the ridge is electrically coupled with the ground plane at the end of the waveguide channel, and the ridge provides a gap between itself and the waveguide periphery;

an aperture in the ground plane section circumscribed by the waveguide periphery and ridge coupling with the ground plane; and

wherein a projection of the gap between the ridge and the waveguide periphery on the ground plane, is transverse to the microstrip transmission line.